

**CLAIMS**

1. A method for pre-detecting responses in a secondary radar, the responses to be pre-detected comprising a message coded by a modulated signal, characterized in that :
  - (i) the presence of a signal exhibiting modulation characteristics in accordance with those of a message of a response to be pre-detected is identified ;
  - (ii) the duration of the signal identified is measured ;
  - (iii) the duration of the signal identified is compared with a minimum duration, the minimum duration being determined on the basis of an expected duration of the messages of the responses to be pre-detected.
2. The method as claimed in claim 1, in which the messages being coded by a position-modulated signal, the presence of a signal is identified when a sequence of pulses is present in which each pulse of the sequence is separated from that which precedes by at the most a duration of the order of a modulation period.
3. The method as claimed in claim 2, in which the presence of a signal is identified by generating a slot whose duration is substantially equal to the duration separating the first from the last pulse of the sequence of pulses, to within a modulation period .
4. The method as claimed in claim 3, in which to generate a slot, pulses are detected, and a stable signal is generated on the basis of the detection for a duration equal to the maximum time until the next detection of a message pulse.
5. The method as claimed in claim 4, in which the duration of the stable signal generated on the basis of a falling edge is substantially equal to the duration of a modulation period plus 20%.
6. The method as claimed in claim 4 or 5, in which the pulses are detected by thresholding with respect to a level determined as a function of a peak level.

7. The method as claimed in any one of claims 3 to 6, in which the duration of the signal identified is measured by measuring the duration of the slot.
- 5 8. The method as claimed in any one of the preceding claims, in which the responses to be pre-detected being mode S responses, the minimum duration of the messages is of the order of 56 microseconds for short responses or of the order of 112 microseconds for long responses.
- 10 9. A method for detecting responses in a secondary radar, the responses to be detected comprising a preamble and a message, the preamble containing protocol data, the message being coded by a modulated signal, characterized in that :
- a method of pre-detection is implemented according to any one of the
  - 15 preceding claims, to pre-detect the responses to be detected ;
  - a forecast position of the preamble of each pre-detected response is determined ;
  - a check is made to verify whether determined protocol data are present at said forecast position of the preamble.
- 20 10. The method of detection as claimed in claim 9, in which the forecast position of the preamble is determined on the basis of the start or of the end of the signal identified in step (ii) of the method of pre-detection.
- 25 11. The method as claimed in claim 9, in which the responses to be detected being mode S responses, a detection is generated when at least N pulses out of four are present at the forecast position of the preamble, where N is a parameter whose value lies between 1 and 4, the limit value 1 being used to detect very scrambled responses, the limit value 4 being used to detect clear
- 30 responses.
12. A method for detecting responses in a secondary radar, the responses to be detected comprising a message coded by a modulated signal, characterized in that :

- a method of pre-detection as claimed in any one of claims 1 to 8 is implemented, to pre-detect the responses to be detected ;
  - a clock signal is generated at a message-based binary tempo ;
  - the position of the start of the response is precisely determined on the basis of the start or of the end of the message.
- 5